Hopelessness Moderated by Social Support Predicting Depression in Lung Cancer Patients

Research Thesis

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Abstract

Background: Lung cancer patients have the highest risk for developing depression amongst all cancers. Hopelessness is a known predictor of depression. Previously, social support was found to lower hopelessness and depression symptoms in breast cancer patients. These results have yet to be replicated with other types of cancer. This study tested hopelessness, social support, and their interaction as predictors of depressive symptoms in patients newly diagnosed with stage IV non-small cell lung cancer (NSCLC).

Methods: Patients with stage IV NSCLC (N=186) completed self-report measures for hopelessness (BHS), social support (SNI and marital status), and depression (PHQ-9 at diagnosis. Depression was assessed again months later. Spearman correlations examined the relationship amongst predictor (hopelessness, SNI, marital status), covariants (age, income, employment), and outcome (depression) variables. For each measure of social support, a multiple regression tested baseline hopelessness, social support, and their interaction as predictors of depression at baseline and four months while controlling for the relevant covariates. Baseline depression included with the follow-up regression to compare scores.

Results: About half the patients scored for mild depression (M = 6.37, SD = 5.22) and mild hopelessness (M = 4.27 SD = 3.26) at baseline. After a correlational examination, only income was found to be significantly associated with baseline depression ($p<0.05$). Marital status had no significant effect on hopelessness or depression at either time points. At baseline, hopelessness was a significant predictor in marital status ($p = 0.02$) and SNI ($p<0.001$) models. The interaction between SNI and hopelessness was significant for predicting depression at 4-month follow-up ($p<0.05$). Low social support was associated with higher scores of hopelessness and depression after controlling for relevant covariates. Depression scores were unchanged for patients with medium to high social support despite their degree of hopelessness.

Discussion: Social support moderates the relationship between hopelessness and depression in NSCLC patients. With this in mind, medical staff should monitor hopelessness symptoms and recognize their role as patients' support system as to promote successful prognosis.

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1. Introduction

When a person perceives a threatening or challenging event, their physiologically and psychologically reaction is considered the stress response (Payne, 2014). These events increase inflammation throughout the body starting downstream at the cellular level with the release of glucocorticoids (Chaby, 2016). This triggers a sense of urgency throughout the body to promote mobilization of energy and assist in recovery after stressful events. However, the inability to recovery can generate chronic inflammation. Overtime inflammation can provoke neurochemical and affective changes associated with depression (Anisman, Hayley, Turrin, & Merali, 2002). Chronic inflammation and depression are known risk factors for chronic illnesses such as rheumatoid arthritis, Alzheimer, cardiovascular disease, diabetes, and cancer (Reuter, Gupta, Chaturvedi, & Aggarwal, 2010).

Cancer patients are considered to have the highest rates of depression amongst all chronic illnesses (Ringdal, 1995). Patients commonly experience feelings of hopelessness as they cope through their prognosis. As treatments and related side effects become increasingly difficult to manage, patients' attitudes shift to less optimistic and perceive their illness as out of their control. At the time of diagnosis, lung cancer is commonly in an advanced stage and the prognosis is a few months. During this short time, patients experience high rates of psychological distress, such as hopelessness and guilt (Vijayvergia, Shah, & Denlinger, 2015). This guilt stems from patients feeling they caused their cancer due smoking. Consequently, patients feel stigmatized which reinforces hopelessness feelings. These attitudes have been associated with low adherence to treatment and other poor health behaviors, like smoking, which decreases the chance of survival. Patients continue smoking despite health advisory because they lack the emotional support needed to for lasting cessation. Brothers Andersen found recurrent breast

cancer patients whom had a significant other were less at risk of developing depressive symptoms, regardless of hopelessness status prior (2009). This study highlights the how social support can buffer hopelessness during stressful events, such as cancer treatment. Support can help increase adherence, hope, and self-efficacy in patients.

Previous lung cancer literature has focused on causality and prevention, and there is a lack of exploration in psychosocial effects of patients. This study aims to bring forward this issue and further examine ideas previously discussed. Consistent with Brothers Andersen findings, we hypothesis that advanced staged lung cancer patients' hopelessness and presence of social support at initial diagnosis will predict depressive symptoms months. Assessments are conducted diagnosis and following appointments. We created two models to represent social support, marital status and social network. afterwards. Analyses used these models relevant covariates as predictors of depressive symptoms.

2. Materials & Methods

2.1. Procedures

From June 2017 to August 2019, patients with advanced lung cancer were recruited from the Thoracic Oncology clinics of an NCI-designated Comprehensive Cancer Center (OSUCCC) to participate in an observational study. Participant inclusion criteria included: newly diagnosed with stage IV NSCLC, eighteen years or older, English-speaking, and respond to self-report measure interviews either in-person or by telephone. Exclusion criteria included: previously treated with definitive chemo-radiotherapy, received treatment for over a month before enrollment, disability in hearing or vision, or psychiatric impairments preventing consent or self-report measures completion in English.

Consent was completed by a research personnel in person. The assessments of patient-reported outcomes were conducted by trained interviewers over the phone within two weeks of enrollment. Patients were given a booklet to follow along with the interview and item responses. All measured variables were assessed at baseline, but only the outcome variable was assessed every two months following baseline assessment. Patients received $15 for participation.

2.3. Measures

2.3.1. Predictor

Hopelessness. The Beck Hopelessness Scale (BHS) (Beck, Weissman, Lester, & Trexler, 1974) is a 20 true–false items self-report measure that assess three dimensions of hopelessness (feelings about the future, loss of motivation, and future expectation). For each item, a score of 0 or 1 is assigned. An individual's total hopelessness score is the sum of the items' scores. The total scores range from 0-20, with higher totals reflecting higher levels of hopelessness. Cut-off values for the BHS are 0-3=normal, 4-8=mild, 9-14=moderate, and 15-20=severe. Internal consistency reliability was α=0.805.

2.3.1. Moderators

Social Support and Connections. The Social Network Index (SNI) (SNI; Berkman & Syme, 1979), a 16-item measure of social contacts and involvement, was completed. The measure assesses four types of social contacts: marital status, number of close friends and relatives, church group membership, and membership in other groups (social, vocational, child-related, service-oriented, other). Frequency of monthly contact for only close friends and relatives is asked. Intimate contacts are weighed more heavily than group memberships in calculation. The items are summed together for a total score. Marital status was excluded from the score calculation. Scores range from 1-12, with

higher scores indicating more social connections. Social connection scores can be divided into categories, low=1, medium=2-5, medium-high=6-7, and high=8-12.

Marital status. Using the single item about marital status, individuals indicate current presence of having a significant other or not. Being married or having a partner is scored as 1. Widowed, separated/divorced, single is scored as 0.

2.3.2. Outcome

Depression. The Patient Health Questionnaire-9 (PHQ-9) (Kroenke, Spitzer, & Williams, 2001) is a 9-item self-report scale that assesses the frequency of symptoms of major depressive disorder over the past two weeks; as defined by the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV). Items are rated on a 4-point Likert scale (0=not at all to 3=nearly every day), then summed for a total score ranging 0-27; higher scores indicating higher levels of depressive symptoms. Cut-off values are 1-7= none/mild, 8-14=moderate, 15-19=moderate to severe, and 20-27=severe. Internal consistency reliability was α=0.806. Two other elements of the PHQ-9 were considered: suicidal ideation item (thinking one would be better off if dead; thoughts of hurting oneself) and a final item's score which assesses a patient's overall difficulty with life activities/relationships due to the symptoms, rated from 0 (not difficult) to 3 (extremely difficult).

***2*.3.3. Covariates**.

Age and Income. Both are separate single items. Low income was considered as having an income of ≤$25,000 which is below the Ohio poverty line for a family of four.

Employment status. A single score including both items pertaining to occupation type and employment hours (to determine full or part time). An individual is considered currently employed if their occupation is: retired, but working full or part time; employed

full or part time; or a homemaker, raising children, care of others. An individual is considered not currently employed if their occupation is: retired; temporarily unemployed and seeking employment; or disabled.

2.4. Statistical Analysis

Descriptive statistics were completed. In the preliminary analysis, Spearman correlations tested the relationships between covariates and depressive symptoms at the different time-points (2, 4, 6 months). Any significant covariates were used in the regression model for that coordinating time-point. Hierarchical multiple regression models were used tested the relationship between baseline hopelessness (BHS), social support (marital status or SNI), and their interaction, and depressive symptoms (PHQ-9) at follow-up. There were separate models for each type of social support. The regression order of variables were as follow: covariates, baseline hopelessness, model's type of social support, and the interaction of baseline hopelessness and social support.

3. Results

3.1. Descriptive Analyses

One hundred and eighty-six (N=186) patients were enrolled (see Table 1). Patients had an average age of 62 (SD±11.7 years; range 27-92). Over half were male sex (n=103; 55%). 57.5% are currently married (n=107). 49.5% earned more than a high school education (n=92), 25.3% are currently employed (n=47), and 23.7% are categorized in low income (n=40).

At baseline, 42.4% (n = 79) of patients had mild levels of hopelessness (see Table 2). On average, patients reported medium levels of social support (m = 4.53, SD = 3.12). At baseline, 17.7% (n =33) of patients were at or above clinical cutoff for depression

(scores between 15-27). By four months, clinical cutoff for depression decreased to 2.15% (n =4).

3.2. Preliminary Analyses

Of the control variables tested, low income was significantly correlated with baseline depression (r = 0.182, p = 0.019). Low income (r = 0.205, p = 0.026) and employment status (r = -0.17, p = 0.5) were significantly associated with depression symptoms at 2-month follow-up. No covariates were significantly correlated with depression at 4-month follow-up.

3.3. Primary Analyses

Two regression models were conducted for each time point. Model one tested marital status (Table 3) and model two tested SNI (Table 4) as predictors for depression. Neither marital status nor SNI were found to be significant predictors at any time point. At baseline, hopelessness was a significant predictor in model 1 (p = 0.02) and model 2 (p<0.001). At 4-month follow-up in model two, hopelessness was a significant predictor once more (p<0.05). In the same model and time point, model two's interaction term was found significant (p = 0.039), meaning the model at 4-months is significant. Neither model or any predictors were significant at 6-month follow-up.

4. Discussion

As hypothesized, hopelessness moderated by social support predicted depressive symptoms months later in lung cancer patients. It was found that patients have a low social network had a stronger effect on the relationship compared to moderate or high levels of social network. The interaction of hopelessness and social network was only significant at predicting depression at 4-month follow-up.

As Brothers & Andersen discovered, baseline hopelessness was a significant predictor for follow-up depression, which aligns with the theory of hopelessness depression (2009). In their recurrent breast cancer population study, having a significant other had a greater impact than social network. In this study, the opposite was found. This difference may be explained by sex differences between the cancer populations. In 2019, the incidence rates for breast cancer was dominantly women, while lung cancer was fairly even between sexes (Siegel, Miller, & Jemal). Women are more likely than men to seek out support, specifically family and friends (Liddon, Kingerlee, & Barry, 2017). Recurrent breast cancer patients typically seek out partnership to cope (Korotkin, et al., 2019). Considering both the genders and types of cancer in each study, it may explain why marital status support was significant for breast cancer patients and not lung cancer. However, both studies highlight how different populations benefit from different forms of support, and that having support impacts depressive symptoms.

Gender differences in coping strategies may partially explain why the martial status model was nonsignificant, it is still puzzling how no effect was seen at any time point. A possible explanation could be less than half the patients did not have a partner whether single, divorced, or widowed. These patients may have learned to rely more on their social network for needed support rather than seeking out a partner.

Even though there was no main effect seen in social network as a predictor, it shows promise that it was found significant at 4-month follow-up. This may indicate that over time social support matters more for patients. However, our results at 6-month challenge this logic. This was another puzzling result as one would expect the interaction effect to become stronger, not lost. This speaks to one limitation found in our study being patient number decline and, consequently, a loss of power in the models. However, attrition is expected and unpreventable due to the unfortunate mortality rates of lung cancer. The majority of patients' depression scores

were mild (54.8%) and could be another possible source of lost power. Social support may have a greater effect on moderate or severe depressed populations, which was about 12% of our population at baseline and 2% by 4-month follow-up. Even though this does not benefit our analyses, it is comforting to see most patients in the mild category rather than severe. These limitations relate to variables, depression and mortality, outside our control.

Our study did not find any new, major discoveries, but stresses the importance social support has over time in buffering the effects of hopelessness and depression of cancer patients. It is important medical staff and social networks recognize their role in patients' quality of life especially for patient populations having a shorter life expectancy. Early screening of depression can help medical staff monitor patients throughout treatment. Patients may be unlikely to reach out for support or unaware of available resources. Staff can relay information about proper resources based on needs and preference, such as therapy or support groups. Medical staff can work with social works and psychologist to properly screen patients and increase accessibility of resources. Through this partnership, mental health interventions can be implemented at critical time points to prevent the progression of depressive symptoms from hopelessness. Early screening and interventions may benefit patients most since baseline symptoms predicted depression later. Individual or group therapy can provide additional support especially for low social network patients as they are the most vulnerable.

Future studies should consider using a different metric for social support. Previous studies and ours included measured quantity rather than quality of social support. A larger network may not equate to higher quality support received. Social Network Index follows the assumption a larger network equals more support and well-being. However, this is not always the case. As stated previously, men are less likely to seek out help so, having a larger network does not necessarily mean it is being utilized (Liddon, Kingerlee, & Barry, 2017). It is suggested that

future research assess the quality patients receive from their various kinds of support alongside the network size. Future research should also consider tracking hopelessness and depression changes in relation to treatment procedures as to help medical staff become aware when patients will need support the most. Also, staff and therapists can implement preventative measures to help patients before those critical points.

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Tables and Figures

Table 1

Sociodemographic Characteristics of Patients at Baseline

Baseline characteristic	*% (n)*
Gender	
Male	55.4 (103)
Age [a]	62.5 (11.7)
Highest educational level	
Less than high school	13.4 (25)
High school	37.1 (69)
More than high school	49.5 (92)
Employment Status [b]	25.3 (47)
Low Income ($25,000 >)	23.75 (40)
Marital status	
Single	11.8 (22)
Married/partnered	57.5 (107)
Separated/divorced	19.9 (37)
Widowed	10.8 (20)

Note. N = 186

[a] Reflects the mean and standard deviation of patients.

[b] Reflects the percent and number of patients categorized as employed.

Table 2

Characteristics of Patient Measures at Baseline and Follow-Up

Measured Variables	0M *% (n)*	2M *% (n)*	4M *% (n)*	6M *% (n)*
Hopelessness [a]	4.27 (3.26)			
Normal	52.2 (97)			
Mild	30.6 (57)			
Moderate	10.2 (19)			
Severe	1.6 (3)			
Social Network Index (SNI) [a]	4.53 (3.12)			
Low	44.6 (83)			
Medium	28.5 (53)			
High	23.1 (43)			
Depression (PHQ-9) [a]	6.37 (5.22)	5.8 (5.48)	5.27 (5.15)	4.27 (3.82)
None/Mild	54.3 (101)	44.1 (82)	33.3 (62)	28 (52)
Moderate	25.8 (48)	10.8 (20)	12.4 (23)	8.6 (16)
Moderate/Severe	8.6 (16)	5.9 (11)	0.5 (1)	0.5 (1)
Severe	3.76 (7)	2.2 (4)	1.6 (3)	0 (0)

Note. N = 186

[a] Represents the values *M* and SD in replacement of reporting *%* and *n.*

Table 3

Summary of Hierarchical Regression Analysis for Model 1: Marital Status

	Baseline		2-Month		4-Month		6-Month	
Variables	*ß*	*t*	*ß*	*t*	*ß*	*t*	*ß*	*t*
1. Low Income	0.99	1.08	0.68	0.61				
2. Employed			-2.03	**-2.11***				
3. PHQ 0M			0.61	**5.79****	0.36	**3.56****	0.16	1.66
4. H	0.82	**2.33***	0.34	0.85	0.5	1.24	0.18	0.42
5. MS	0.04	0.04	1.22	0.89	0.88	0.62	-1.42	-1.5
6. H x MS	-0.06	-0.29	-0.18	-0.78	-0.1	-0.41	0.04	0.17

Note. $N = 186$

PHQ, Patient Health Questionnaire; 0M, baseline; H, hopelessness; MS, marital status.

Bold, *p<0.05, **p<0.01.

Table 4

Summary of Hierarchical Regression Analysis for Model 2: Social Network

	Baseline		2-Month		4-Month		6-Month	
Variables	*ß*	*t*	*ß*	*t*	*ß*	*t*	*ß*	*t*
1. Low Income	0.23	0.25	0.31	0.28				
2. Employed			-1.93	-1.92				
3. PHQ 0M			0.61	**5.57****	0.33	**3.12****	0.17	1.16
4. H	0.93	**5.17****	0.34	1.61	0.71	**3.26****	0.28	1.31
5. SNI	-0.11	-0.63	0.28	1.4	0.34	1.66	-0.05	-0.23
6. H x SNI	-0.06	-1.69	-0.07	-1.81	-0.08	**-2.1***	-0.01	-0.28

Note. $N = 186$

PHQ, Patient Health Questionnaire; 0M, baseline; H, hopelessness; SNI, Social Network Index.

Bold, *p<0.05, **p<0.01.